BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Applied Science
Unit number and title	**Unit 23: Materials Science**
Learning aim	**B**: Examine the uses, benefits and limitations of developing nanotechnology materials.
Assignment title	**Nanotechnology**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are an apprentice materials science technician working for 'Re-Turn', a research and development company specialising in tailor-made polymer products. The company has strong community links and often sends its employees out to local sports clubs and other community groups to do voluntary work. You have been tasked with supporting the level 3 BTEC students at a local secondary school to understand about the applications of nanotechnology. You are going to write a report based on the case studies of different nanotechnology products. The report will discuss the risks and benefits of nanotechnology products, some of which are found in the products developed by 'Re-Turn'. The students will use your report as a resource document for their studies, so it must be scientifically accurate.

Task	Using your lesson notes and research you have carried out into nanotechnology materials, produce a report for the level 3 BTEC students that includes: • An **explanation** of what is meant by a nanotechnology material, defining this material by size, shape and type through the comparison of properties at microscopic and macroscopic level, highlighting differences between these. • An **explanation** of the uses (e.g. computing and instrumentation, energy, nanosolar cells, nanomedicine, chemotherapy, nanoengineering, nanomachines, nanochemistry) and benefits (e.g. higher strength, lighter weight, greater chemical reactivity, scratch resistance, improved catalysis, improved electrical conductivity, antibacterial coatings) of **two** different nanotechnology materials of your choice. Re-Turn, for example, have produced an epoxy gelcoat modified with carbon nanotubes to coat the surface of kayaks and also specialise in nanoelectronics • Some high-profile nanotechnology materials, in particular silver nanoparticles and titanium oxide nanoparticles have

	caused health and safety concerns (safe handling risks to employees, exposure levels, high toxicity) amongst scientists and the public. **Discuss** the uses, benefits and health and safety risks of using these two examples of nanotechnology materials to employees, the public and the environment. **Evaluate** the health and safety risks, environmental impact and benefits of specific uses of these two examples. Ensure that you use evidence to support valid conclusions.
Checklist of evidence required	A report which: • Explains what is meant by a nanotechnology material; • Contains a case study that explains the uses and benefits of two different nanotechnology materials of your choice; • Discusses the uses, benefits and health and safety risks of using silver nanoparticles and titanium oxide nanoparticles to employees, the public and the environment. • Evaluates the health and safety risks, environmental impact and benefits of specific uses of silver nanoparticles and titanium oxide nanoparticles. Sources of information must be appropriately referenced. Correct scientific terminology must be used.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
B. D2	Evaluate the uses, benefits, environmental impact and health and safety risks of using nanotechnology materials for given applications.
B. M2	Discuss the uses, benefits and health and safety risks of nanotechnology materials.
B. P2	Explain what is meant by a nanotechnology material.
B. P3	Explain the uses and benefits of nanotechnology materials.

Sources of information to support you with this Assignment	http://www.understandingnano.com/carbon-nanotubes-kayaks.html http://www.re-turn.no/about-us/ http://www.docbrown.info/page03/nanochem07.htm http://www.sigmaaldrich.com/materials-science/nanomaterials/silver-nanoparticles.html http://particleandfibretoxicology.biomedcentral.com/articles/10.1186/1743-8977-10-15 http://www.nanopartikel.info/en/nanoinfo/materials/titanium-dioxide
Other assessment materials attached to this Assignment Brief	